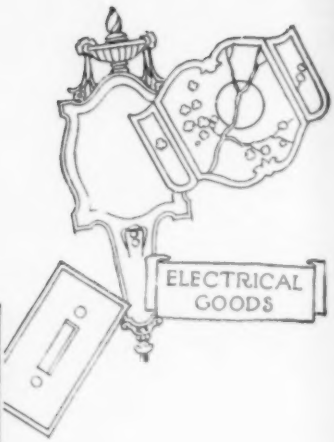
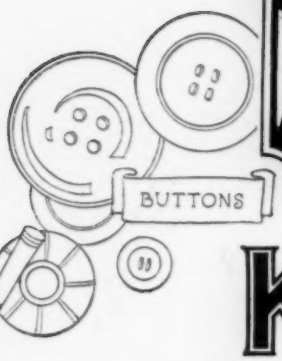
PLASTICS

A Periodical Devoted to the Manufacture and Use of Composition Products

JANUARY, 1926

A better basis for quality products





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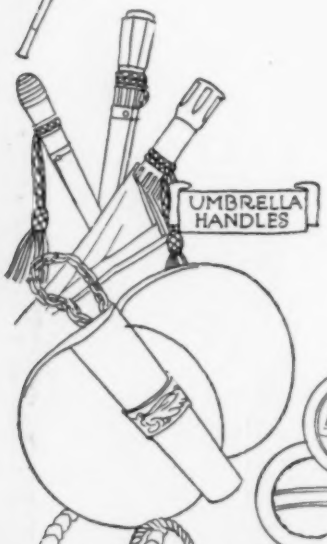

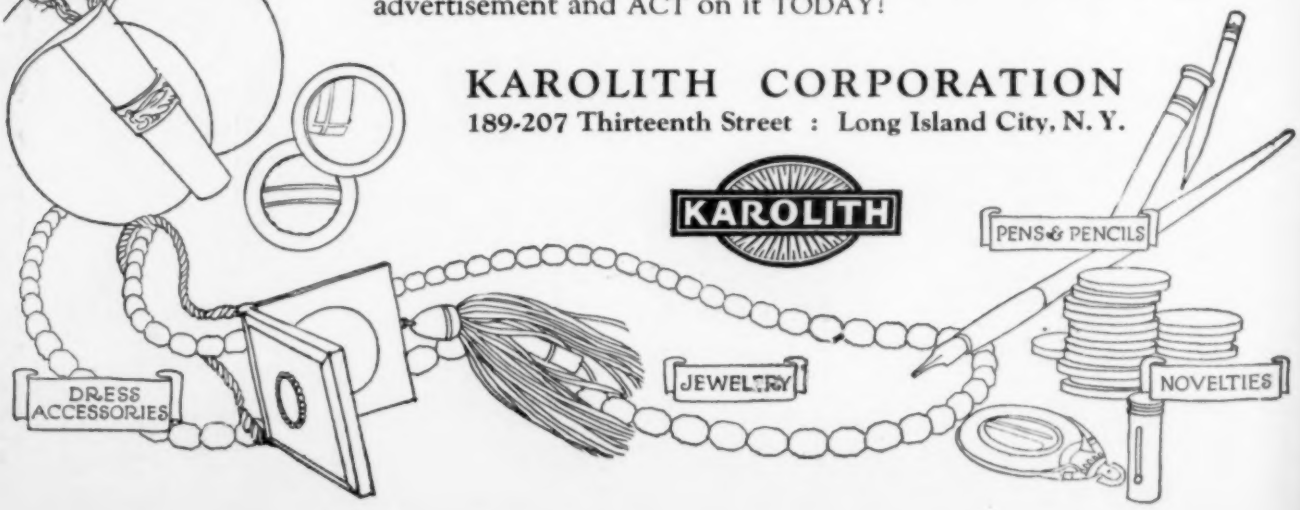

KAROLITH CORPORATION

189-207 Thirteenth Street : Long Island City, N. Y.

KAROLITH

SINCE early youth, one of our pet hobbies has been the opening of letters. We look at them all, from the solicitation of funds for marble palaces for editors to earnest requests for positions from captains of industry.

From time to time this column has reproduced letters of commendation, and we are thankful to say they still come in to gladden our hearts. But the other letters have their little thrill too.

One particular type of matter that pleases us is the demand for information. Manufacturers asking for cellulose acetate in sheets; the fabricator seeking the maker of rolls for pyroxylin button compositing; interested parties desiring contact with any American manufacturer of Pollopas.

A business paper such as PLASTICS must not only seek the highways and byways for new and interesting ideas, but to be of greatest service to its readers, it should act as a clearing house for those seeking information.

PLASTICS will not only do this always but, whenever possible, will publish under a Question and Answer Department the diverse and helpful problems that our editorial advisors have tried to solve.

If you have a production problem, an obtuse or knotty technical detail; if you wish the name of a company making some necessary items, this publication will place its full resources at your command to get the correct answers.

While PLASTICS places itself at the disposal of the industry, you, Kind Reader, can do an incalculable good by furnishing for publication any problems you yourself have worked out that you think will be of benefit to the industry as a whole. No matter what it may be, the unsolicited contributions to these columns will have our most earnest consideration and heartfelt thanks. *The Publisher.*

PLASTICS

A periodical devoted to the manufacture and use of plastic and composition products

Vol. 2 January, 1926 No. 1

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Vol. 2 JANUARY, 1926 No. 1

With the Pioneers—1

Schoenbein, Discoverer of Cellulose Nitrate

Basis of Modern pyroxylin plastics industry was laid 80 years ago by the invention of guncotton

By Carl Marx

THE birth of a new industry and the discovery of a material that, more than is generally realized, has profoundly influenced all modern history, took place just four score years ago.

Modern warfare found a new and potent propellant for its most powerful projectiles; the dreaded torpedo found a deadly charge of a harmless appearing substance, and the great events of the world's history as well as the antics of the latest popular comedy star found a transparent pellicule on which they might be recorded—all of the same basic material. The entire art of plastic molding was led into new channels, and countless subsidiary industries arose and prospered due to this epoch-making event—the discovery of cellulose nitrate.

It was in the Fall of 1845 and the Spring and Summer of 1846 that the experiments which led to the discovery of cellulose nitrate took place. Christian Friedrich Schoenbein, a professor of Chemistry at Basle. while working on a problem in reality quite remote from the subject, treated some paper some sugar and some cotton with a mixture of nitric and sulphuric acids, and was much astonished at the remarkable properties developed in these substances by such a comparatively simple treatment.

CHRISTIAN FRIEDRICH SCHOENBEIN

Schoenbein, however, at once recognized the extreme importance of his discovery and immediately took steps o bring the same to the attention of the leading men of science of his day and to the governments of several countries.

Before discussing this remarkable discovery, it might be well to dwell a little on the personality of this man, whose scientific achievements have assured him of lasting fame, even if he had never found the secret of the effective nitration of cellulose.

Christian Friedrich Schoenbein was born on October 18th, 1799, at the town of Metzingen, in Wurtem-

burg. His chemical career started at an early age, for when but 14 years old he entered the employ of a chemical works at Boeblingen. There his skill and ability soon caused his employers to entrust him with difficult and intricate chemical operations, and eventually he held a position of considerable responsibiilty.

He stayed with this concern for seven years, when, in 1820, at the recommendation of his employer he obtained a position with the well known publisher of the Dingler's Polytechnisches Journal, Dr. J. G. Dingler.

This gave the young Schoenbein an excellent opportunity to enlarge his knowledge as the best scientific periodicals of the day and a splendid library thus became available to him. He was wont to study from four to six in the morning, then attend to his regular work until seven at night, when he would resume his studies, often as late as ten at night. He excelled in mathematics and Latin, and was a great admirer of the chemical treatises of Berzelius.

Schoenbein As a Man

But a short time later, he transferred his activities to the chemical works of J. N. Adam near Erlangen in Germany, afterwards attending the University at Tuebingen where he became a pupil of C. G. Gmelin and Prof. Bohnenberger. After completing his studies in 1824 he became an instructor of physics and chemistry at Keilhau. The next years were spent in England, first as an instructor at Epsom and later spending a year in general studies at London. Paris saw him in 1827, attending the lectures of such famous scientists as Gay-Lussac, Ampere, Despretz and Thenard.

His most important post, however, and one that he held for over forty years, was that of professor at the University of Basel, Switzerland, from 1828 to 1868.

Personally, Schoenbein was a remarkable man. One of his outstanding characteristics was his deeply religious nature. He had a profound respect for nature's workings, saying on one occasion "No matter how large the sum-total of human knowledge may appear to the uninitiated, it is only the experienced savant who recognizes the gaps and omissions and who admits that regarding all that nature is capable of and knows, but a tiny fraction has as yet been uncovered by man."

His family life was throughout a happy one, except for the grief caused by the untimely death of one of his four daughters in England. He had married in 1835 and for thirty-three years, was universally beloved and esteemed by his contemporaries. He was highly sociable, had a fund of good humor and a host of friends. His acquaintance, and correspondence with other great men of his day, gave rise to a large number of highly interesting letterms, many of which have been published in book form. His friendship with Michael Faraday, the English scientist, was of long standing, and he survived him by scarcely a year.

Although in robust health for most of his life, Schoenbein contracted the dreaded disease, anthrax, and died after only a few days' illness at the home of a

(*Continued on page 30*)

Finds New Use for Ivory Nut Waste

By Lawrence E. Whitlock

FOR many years the large amount of waste that results from the manufacture of ivory nut buttons has been a practically useless material. One of the few methods of employing it comprised the polishing of cut buttons by tumbling them in the powdered waste, and it has also found some application in dusting bakers' tins to prevent adhesion of loaves of bread in baking.

Recently another new use for this material has been found, and one that is perhaps somewhat odd, as it so far removed from the other uses of ivory nuts. It is nothing less than the use of the powdered waste as the inert ingredient in a disinfectant compound.

According to United States patent 1,563,604, of December 1st, 1925, granted to Lawrence E. Whitlock, an organic substance such as vegetable ivory is reduced to a powder of about the fineness of ordinary cornmeal. The waste material that is produced in the manufacture of buttons is very suitable for the purpose.

The second ingredient of the disinfectant is powdered nitercake, which is the acid sodium sulfate that results from the manufacture of nitric acid from Chile saltpeter and sulfuric acid. As this niter-cake is so very hygroscopic and by taking up water from the atmosphere would bake together into a hard mass, very difficult to use, enough of the ground up ivory nut waste is added to prevent this and a dry, easily running powder is obtained.

The proportions of ivory nut waste varies from two to ten percent of the entire mixture.

The reason the ivory nut waste is superior to ordinary cellulose which might be used for the same purpose, is that the ivory nut is not affected by the sulfuric acid present in the niter cake. Inasmuch as considerable waste, as high as 30%, is produced in making buttons from vegetable ivory, the tonnage of waste amounts to quite an amount, and any new outlet for this material is welcome to the industry.

Quantity Price Discounts Justifiable

Does the big customer deserve extra consideration on his large purchases?

By M. Hanenson
President, Piroxloid Products Corp.

MUCH has been said, both pro and con, on the question of quantity price discounts The problem, especially at this stage in the development of the plastics industry, is one of outstanding importance, and deserves more than casual comment. For here is a point of controversy between the makers of pyroxylins and the manufacturers of pyroxlin articles that is well worth a thoro airing. Let us examine the present situation.

The availability of plastics in small quantities has given rise to a distinct type of manufacturer. His position is analogous to that of the small sweatshop operator in the clothing industry. Purchasing, let us say, fifty dollars worth of material, he starts the manufacture of some toilet novelty. He rarely figures costs. Why should he? His overhead—practically nothing, labor charges, minimum—he goes blithely on his way with production. And the price, naturally, is low, very low.

The finished articles may, by chance be worth while. But too often they are merely cheap eye-deceiving imitations. This, then, is the competition the large manufacturer must face.

A reputable maker cannot lower price unless he lowers quality. And that solution, as an intelligent, farsighted business man, he will not consider. His production costs have been shaved to a minimum consistent with a policy of sound efficiency. So there is no relief in that direction. Consequently, with the necessarily higher overhead and costs, occasioned by a laudable desire to produce honest, sound merchandise, the large manufacturer finds himself in a precarious position.

M. HANENSON

Does the maker of the raw pyroxylins come to his aid? Does he say, "Here Mr. Big Customer, here is a discount on your large purchases." He does—not!

Yet surely the granting of a reasonable price discount to large buyers is justifiable.

From the sellers point of view, it is proportionately less costly to sell ten thousand dollars worth of material than it is to be filling a multitude of fifty dollar orders. The economies resulting from decreased accounting, selling, storage, credit risk, etc., costs more than cover any discounts that may be granted. Other industries, confronting the same situation, have recognized the soundness of quantity price discounts.

The reaction of the larger manufacturer, at the present time, is a distinct deterent to the advancement of the industry. He feels, and rightly, that the measure of cooperation he has a right to expect has not been forthcoming. For in many cases he finds himself actually restricted in the production of pyroxylin products.

Several months age, the Piroxloid Products Corporation converted an entire floor, that had formerly been utilized for the manufacture of Pyroxylin products, to the making of aluminum articles. The reasons for this move are obvious to the reader.

Viewed from any angle, the advisability of a reasonable price discount is apparent.

If our industry is to march ahead at a steady rate, if the progress that has been made in the last decade is to be continued, it is high time that such discounts be instituted. Let us hope that 'the powers that be' may see the light.

Non-flammable Celluloid Still a Dream

New York City — "Celluloid for use as a novelty product would find a tremendously increased market if it could be made non-inflammable, for the public is wary of those celluloid articles and novelties that are subject to fire hazard," recently said Mr. Rapper, head of the Joseph K. Joseph Company, 31 West 31st Street.

Qualified by ten years' experience in the manufacture of celluloids, Mr. Rapper is in an excellent position to comment on the situation.

He remarked further: "A large number of makers of celluloid products are looking forward to the day that will bring a workable, non-inflammable celluloid to their work-shops. It is no exaggeration to predict that the trade in celluloid novelties will increase five-fold with the advent of such a material."

Bakelite Patents Held Not Infringed

Molding of phenol resin billiard balls disclosed for first time in extensive litigation

By William C. Segal

ON August 12th, 1925, Judge Morris in the United States District Court at Delaware, rendered a decision, published in the Federal Reporter, 2d series, Vol. 7, page 697, November 26th, 1925, to the effect that the United States Patents 942699 and 942809 were not infringed by the Brunswick-Balke-Collender Company in the manufacture of billiard balls from phenol-formaldehyde condensation products.

Patents in Suit

The decision is based on the apparently uncontradicted facts that the Brunswick-Balke-Collender Company in preparing the phenol resin does not operate in accordance with the methods of the patents sued upon, and does not use "heat and pressure" in the sense of the Bakelite patents.

The first of the two patents, 942699, was granted December 7, 1909 and covers the use of heat and pressure in converting an initially fusible and soluble phenol resin into the infusible and insoluble stage. The second patent, 942809, granted the same date, covers the use of small amounts of alkaline or base materials as the condensing agents or catalysts in bringing about the condensation of the phenol and the formaldehyde.

The prior art involved, and as admitted in the patents in suit, had already shown that large amounts of alkalies could be used as condensing agents, and also that acid and salts could be used for the same purpose. The specific improvement claimed by Baekland in patent 942809 was the use of small amounts only of alkaline substances, in amounts, to quote the patent claims, of "less than one-fifth of the equimolecular proportions of the phenolic body used."

The method employed by the Brunswick-Balke-Collender Company in preparing the resin for their molded billiard balls, and the subsequent operations of forming the balls differ in their essential characteristics from the operations disclosed by Baekland in the patents on which the suit was brought.

The synthetic resins had been used for some time before the advent of the modern types of phenol-aldehyde condensation products.

Basing his decision upon what had been done in the prior art, Judge Morris came to the conclusion that to form such condensation products in their final state first and then to mold the same was old, and to do so hence did not infringe the Bakelite "heat and pressure" patents.

The defendants process consists of several steps. To a mixture of equal portions of phenol and commercial 40% formaldehyde it adds a base (caustic soda) in an amount equal to about 70 percent of the equimolecular proportion of the phenolic body used. The mixture is allowed to stand for some time. A measured quantity of it is then put into a flask. The flask containing the desired quantity of the mixture is connected with a reflux condenser and the contents heated to the boiling point, acquiring a reddish brown color, and are then poured into a bowl.

Immediately the operator begins adding hydrochloric acid and stirring the mixture vigorously, this being continued until the mixture begins to separate into two liquids. One of these liquids is an aqueous solution, sometimes called "mother liquor," and consists of the free water in the phenol and formaldehyde solution and also of the water which constitutes one of the products of the reaction.

The second or remaining liquid is the other product of the reaction—the condensation product in its initial form. It is light brown in color and oily or viscous in character. The beginning of the separation of the two liquids is evidenced by the appearance of drops of the oily liquid upon the surface of the then milky, opaque contents of the bowl. Thereafter the addition of hydrochloric acid and the stirring are cautiously continued until the separation of the contents is practically complete and the condensation product, now almost entirely at the surface, is caused to boil and bubble by the heat generated by the reaction. The reaction, shown by the boiling to have proceeded far enough, is then checked by the addition of water. The mother liquor soon rises to the top and is poured off.

Forming the Resin

The condensation product, then a hot, white or creamy semiplastic mass, remains. The filler, consisting essentially of lithopone and other inert mineral constituents, is then added, thoroughly mixed and the mass made into a small "pats", which remains overnight in the room in which made and are then put into a drying room having a temperature of 160° to 200°F,

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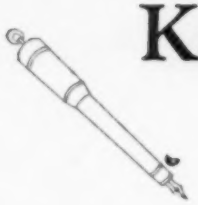


Karolith As a Raw Material

From buttons to mirrors, this casein plastic exhibits its versatility

By George H. Brother

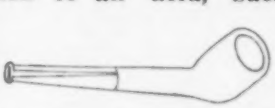
ONE of the most interesting features of the 1925 Exposition of Chemical Industries was the "Court of Chemical Achievement" in which were displayed the outstanding achievements of the past year in chemical manufacture research.

In a glass case were displayed a number of very beautiful objects made, apparently, of jade, amber, pearl and ivory—but a notice explained that these were made of a casein plastic *Karolith.*

As this material is a new comer in this field, some information relative to its properties may be of interest.

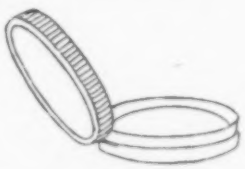
Karolith is the trade name for one of the first all American casein plastic materials. Its development furnishes a new outlet for a practically waste product—skim milk, furnishes the public with a new material in which beauty of color and finish is combined with strength, and marks a definite achievement of American science and American chemists.

Casein is the principal protein material found in milk. Whole milk contains an average of about 2½% casein: skim milk, i. e., whole milk from which the fat has been removed, will average slightly higher in casein. Commercially casein is prepared by coagulation or precipitation from skim milk by the addition of an acid, such as



muriatic or sulfuric, or by the addition of an enzyme such as rennet. Acid caseins find industrial application in the manufacture of glue, paper coating, cold water paint, etc. The principal industrial outlet for rennet casein is in the manufacture of casein plastics, for which it is better suited than acid caseins. In the past, practically all the caseins manufactured in this country were acid caseins, but with the development and growth of the caseins plastics industry, it is safe to predict that a large percentage of skim milk at present wasted will be used in the manufacture of rennet casein.

One of the outstanding properties of casein which has caused its use in other industries make its application to the manufacture of plastics possible. As casein glue causes two pieces of wood to adhere, as casein in paper coating mixture holds powdered China clay to the paper and casein in cold water paints holds the pigment glued to the surface painted, so casein in plastic material holds to itself,



and after hardening with formaldehyde, is a tough, horn-like material of high comparative tensile strength.

The development of *Karolith* is not, in the strict canse of the word, a discovery, since casein plastics have been made and known in Europe for a number of years. This fact does not detract, however, either from the importance of this development or from the brilliance of the achievement, as the European processes were so well protected by secrecy and a confusing mass of patent literature, that it was necessary to proceed through practically the same steps of research and development as though the material was unknown. The research was started in the Mellon Institute of Industrial Research, Pittsburgh, which is a thoroughly American institution for bringing scientifically trained minds to bear on industrial problems. The chemists who have worked

this problem out from the research stage to successful manufacture, are graduates of the University of Kansas, and the Universities of Nebraska and Toronto. The fact that this required five years of intensive study is indication of the difficulties encountered.

Karolith has been produced by the Karolith Corporation, Long Island City, New York, commercially for about a year and a half, in which time the demand for the material has doubled and doubled again. As the trades comes to know the material and recognize its many strong points, they apply it more and more and new fields for it are found almost daily. Thus every indication points to a brilliant future for this material.

This popularity is like every popularity, whether of things animate or inanimate, based on merit. There is no other material known at present which so ideally combines beauty with strength, durability and workability. To this must be added the fact that *Karolith* is not a composition, so is uniform or homogeneous in structure, is practically non-inflammable, odorless and tasteless. It can be made in any color or shade from

a delicate coral or turquoise, to a clear amethyst or jet and the colors are not affected by exposure to the sun's actinic rays. It can also be produced in grained or mottled effects rivaling and often excelling jade, cloudy amber, horn, tortoise shell, etc., in beauty.

This material, which is chemically and practically a synthetic horn, works analogous to horn with this difference—being more uniform in structure and closer grained, makes it possible to produce a more lustrous and lasting polish by means of the same machinery, viz. — high speed rag buff for large objects; tumbling barrels for small. It softens under influence of moderate heat or water, so can be bent and embossed. It turns and drills readily and can be threaded and engraved. It can be dyed or stained, the dye penetrating only the surface, so it is possible to produce beautiful two color effects by engraving designs on dyed material.

These properties make it almost ideal for buttons, for which it is very extensively used. It competes successfully with the high grade horn buttons for overcoats, because it is just as high in quality, if not higher, than natural horn, and is more beautiful. It competes successfully with bone, pearl and vegetable ivory for shirt, shoe and underwear buttons because it can be advantageously worked on automatic machines and the waste is insignificant in comparison with its competitors. There is no other material on the market at present which can successfully compete in the two extremes mentioned as well as with buttons of intermediate quality and price. There is also no other material which can so quickly and easily be made up in new colors and shades to satisfy the demands of changing fashion.

Another field where *Karolith* has very successfuly been applied is the fountain pen and automatic pencil industry. Previously, hard rubber or metals were used, with the result that pens and pencils which would wear well were quite expensive and were not attractive in appearance. Now it is possible to obtain beautifully colored pens and pencils which stand up well in use at quite reasonable prices, thus enabling a greater number of people to enjoy the advantages of these present day necessities.

Karolith is also used in the manufacture of buckles, millinery ornaments, beads, toilet articles, cigar and cigarette holders, radio parts, wall electric switch plates, cutlery handles, etc. A demonstration room equipped with machinery for working the material and the services or advice of experts is available for the asking to anyone interested in the possibility of applying this material.

More Light on Pollopas

Crystallite, an American attempt at reproduction, fails to materialize

POLLOPAS, the organic glass clear synthetic material which was described in December PLASTICS, gives promise of further utility, such as the production of molded products and for impregnation.

An interesting intermediate product, made during the manufacture of Pollopas, is a viscous solution which can be used to impregnate various articles, they being afterwards hardened so as to form the Pollopas right within the pores of the material. As the solutions are alkaline, they can be mixed with shellac, and interesting combinations of this resin with Pollopas are suggested to the investigator. The liquid solutions of Pollopas have been called "Shellan" by the inventors.

As the raw materials, urea and formaldehyde, are neither of them very expensive, and are available in unlimited amounts, Pollopas should, when once the manufacturing difficulties are overcome, have an important place in the industry.

In this connection it might be interesting to point out that some attempts were made a few years ago in the United States to produce a material somewhat similar to Pollopas. It was also made from urea and formaldehyde, but by the use of an acid catalyst. It was known as Crystallite, and had the desirable properties of being molded by heat and pressure. The writer saw some very attractive articles molded both from transparent and opaque Crystallite at a small experimental plant at Staten Island, N. Y.

However, all of the products thus made, afterwards warped and cracked to pieces. This was probably due to the impossibility of removing the acid catalyst, and that some form of polymerization continued to take place. As far as now known, Crystallite was not a commercial success as nothing further has been heard about it. However, it is presented as an example of the line of experimentation that is being followed, and to show some of the difficulties that beset the path of the inventors who devote their energies to the solving of these difficult problems.

Converting Waste Into Wealth

Charles J. Johnson builds new industry by reclaiming the trimmings of pyroxylin plastics.

By James A. Devereaux

"THERE can be nothing of interest to readers of Plastics regarding our business," said Mr. Charles J. Johnson when approached for details regarding the remarkable success he has attained in a business which a few years ago would have been considered an impossibility. "We simply buy celluloid and other plastic waste, sort it, sell it, and are making money."

A most modest statement when you consider that the speaker, but a clerk at a large plastic manufacturing plant less than ten short years ago, is now the controlling factor of a half-million dollar corporation, the Johnson Products Co., including a five-acre plant of most modern construction, dealing with thousands of concerns and handling annually many million pounds of a material formerly considered not only useless but actually dangerous.

Yes! A most modest statement indeed; yet its echoes reveal the success of the life-work of this ambitious young man, and the story of the real value of economy—the by-word of efficiency in American Business—the conversion of a waste material into a valuable byproduct.

Before revealing the story in its entirety, a word or two by way of explanation may prove useful as well as interesting. In the first place, the word "celluloid" is a trade name owned and controlled by one of the large manufacturers, so whenever it is used it refers to all the various plastic compounds despite the fact that each manufacturer has his own individual trade name.

To the public, however, Pyralin, Ivoroid, Nixonoid, Pyroxylin, Fiberloid, Celluloid and so forth all look alike and pass under the same "celluloid" even in our daily news items.

Plastics are furnished by the manufacturers in the form of tubes, rods and sheet, and from these basic forms the multitudinous articles are fabricated. The number of different objects made from the various pyroxylin plastics is legion, and is growing daily. The versatility of the material is unlimited, and its thermoplasticity allows of the manufacture of objects of shapes that would be difficult, if not impossible to produce by any other process than that of plastic molding.

CHARLES J. JOHNSON

The making of plastics, representing millions of dollars worth of output, is controlled practically by a half dozen gigantic concerns, which supply the fabricators with an extremely large variety of shades, colors and effects in the form of rods, tubes and sheet. The material is given its final form by sawing, cutting, stamping, plastic molding or punching.

It will be quite obvious that no matter how much care is taken in the laying out of sheet stock for punching or cutting, a considerable amount of waste results. Considerable skill is often displayed by the fabricators in making use of trimmed material, such as the inside of picture or mirror frames and the like, or the trimming from the handles of a mirror back; these smaller pieces being employed for making smaller parts, powder-box covers, and the like.

Nevertheless, in the final analysis, there is about ten percent of waste, although some intricate shapes cause a wastage of stock as high as 25 percent. With a material as expensive as a good grade of pyroxylin plastic, it is quite evident that a great economic loss would result to the entire industry, if it were not for such fore-sighted

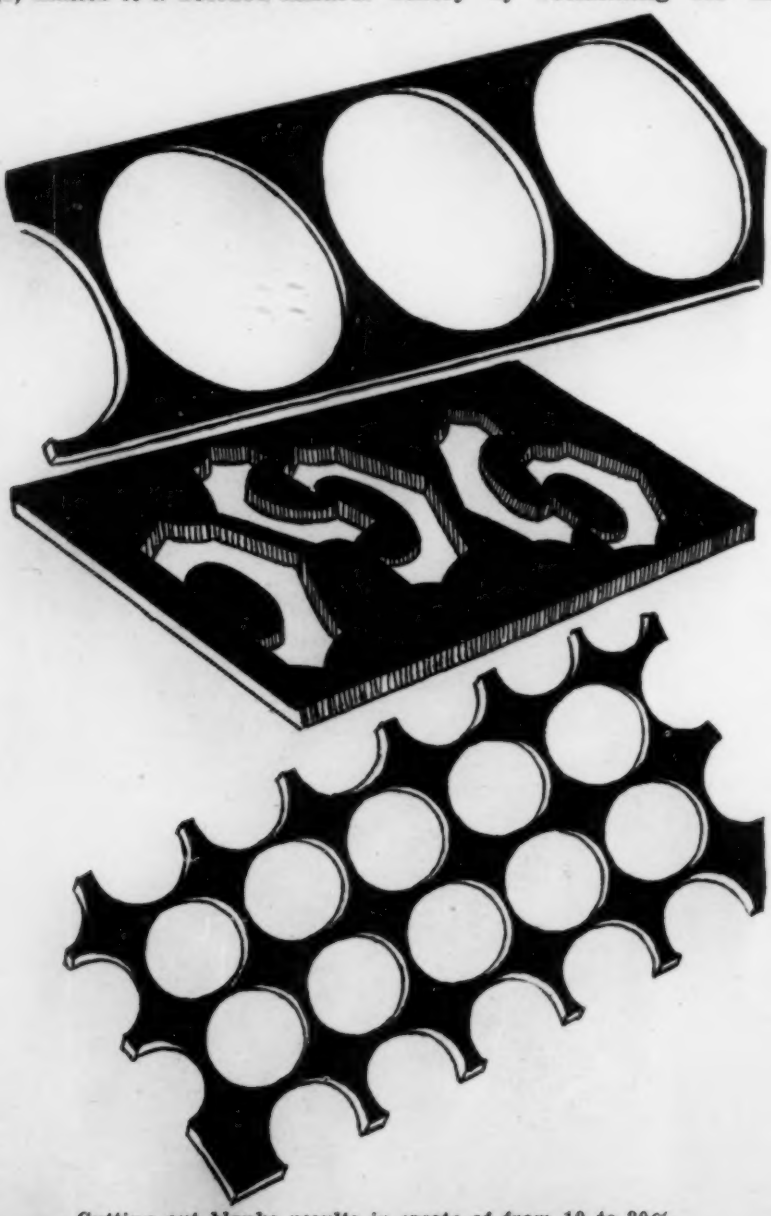
Section of the sorting department of the plant of the Johnson Products Company at Garfield, N. J.

men as Mr. Johnson, who visualized the possibilities of recovering this material, and then had enough of the go-getter in him to make his vision a reality.

Years ago, and especially in New York City, stringent regulations were promulgated by the fire department regarding the disposal of pyroxylin plastic waste. It had to be disposed of within a given time. The usual method was to gather it, take it to an open lot, and burn it up.

Although there is nothing in pyroxylin plastic wastes that would give rise to spontaneous combustion, the extreme inflammability of the product, especially when in the form of fine shavings, makes it a decided hazard. However, when packed in tin lined cases or cans, it represents no greater hazard than other waste products.

So much for the background. At this point let me introduce Charles J. Johnson and his Big Idea. Back in 1918 or 1919, as a junior clerk in one of the big plastic manufacturing plants, Mr. Johnson conceived the idea of recovering all this useless waste. He had many occasions to observe the burning up of the accumulated pyroxylin waste, so he took home a few pieces and began to experiment with it, eventually hitting on a plan that was to spell financial success to him and to help the entire industry by reclaiming for use millions of pounds of perfectly good and useable material—provided one had the vision to see how it could be used. That is what Johnson contributed to the art.



Cutting out blanks results in waste of from 10 to 30%.

Perceiving how easily it burned under direct flame, Johnson decided that it should melt if carefully heated, and which, of course it did.

From this melted condition it could be easily incorporated with new stock. It is on this basic idea that the present business of the Johnson Products Co. is built. Needless to say, it took many months of hard labor and considerable persuasion to convince Mr. Johnson's superiors of the intrinsic worth of the idea.

It was soon found that when pyroxylin plastic are used, a saving of as much as 25% of camphor results, and at the same time an additional bulk of 25% is obtained, for most of the pyroxylin plastics consist of about one-fourth camphor and three-fourths cellulose nitrate. Upon such economical recommendations the use of waste becomes of standard method in many plants.

When the first experiments had been conducted, Charles J. Johnson, sensing his great opportunity, borrowed five hundred dollars and started to collect plastic waste. He had no difficulty in obtaining quantities of it, paying but little for it, as most plants were glad to find somebody who would take it off their hands.

At first he used his back yard of his home for his place of business, and when some of the "big fellows" wanted certain colors of plastic waste material, Johnson was able to supply them, giving them spot deliveries. From this back-yard plant and the borrowed five hundred, the present world-wide business has developed, the company dealing with concerns in practically every State of the Union, Canada and Europe. Probably close to a million pounds of diversified plastic

(*Continued on page 24*)

Watch the Well Dressed Londoner

English styles include many novelties made to resemble tortoise shell and horn

PARIS, the Mecca of all feminine styles and of new bizarre fashions, has been furnishing smart women throughout the world with many interesting articles made wholely or in part of plastic products.

An Eton undergraduate smartly attired

When it comes to men's fashions and novelties, however, Paris must take a back seat to London. Not only do all clothing styles come from the home of Prince Edward, but many adjuncts to men's apparel also originate there.

No perfectly dressed Londoner, such as the young gentleman pictured on this page, steps out of his dressing room without the necessary accessories to complete his attire, such as a proper cigarette case and match box.

For many years, silver has been the material from which such articles have been made, but recently there has been a vogue for a personal case made to resemble tortoise shell. Of course casein or pyroxylin are the materials the manufacturers actually use, for nothing else has the advantages these products have for beauty and serviceability.

It generally takes about six months for a man's style to cross the water; so American manufacturers should soon be prepared for requests from the better shops for articles similar to those pictured here.

Shell cigarette case

Ash tray of casein plastics

Highly colored cigar case

The Rex Novelty Works, 10 East 12 Street, presented a most interesting line of celluloid novelties for the holiday trade.

Vari-colored, hand painted shoe horns for Miladys boudoir, featured the Rex showing.

The Athol Comb Company has recently moved into offices at 303 Fourth Avenue, New York City.

Have Successful Year

A remarkably successful year in toilet goods and gift wares is reported by Samstag and Hilder Bros.

The department, which is under the personal care of Mr. Samstag, did a record breaking business and doubled the sales of any previous year in these lines.

Atomizers, shell burners, and French gilt ware studded with gems, were among the most successful items sold this season.

Cartwell Lectures

N. Madison Cartwell, controller of the Celluloid Company, talked to a group of New York University students some time ago on the subject "Manufacturing as a Vocation."

Mr. Cartwell pointed out the splendid field for advancement that manufacturing offers to the college man to-day.

His address aroused considerable comment and interest among the students present.

EDITORIAL · IMPRESSIONS

Friendly Cooperation Gets Results

AS we enter upon the new year and attempt to peer into the future, there is one thing that strikes us more forcibly than any other. And that is the new spirit of cooperation that is rapidly permeating not only industry, but the whole civilized world.

Perhaps no better exemplification is to found for this than the splendid gesture made by the nations of Europe who but a few years ago were at each others throat, in a death struggle for supremacy. Some thing of the same nature is taking place in industry, right here in our own country.

Competitors who a few years ago were desperately trying to wrest what little business there was obtainable from each other by ruthless competition, price-slashing and a host of other ill-advised methods, are beginning to see a great light.

The realization that after all there is just a certain definite demand for a line of goods, and that if there are too many in the same field an over production must result, has led them to the conclusion that anything that increases the demand for the whole field redounds to the benefit of those engaged in meeting the demand.

By friendly cooperation, the whole industry is raised in tone and by limiting useless competition, releases resources for the development of things that are new and which, in consequence of their novelty, increase the demand. This is true especially of the Plastic industry—both in pyroxylin as well as molded resin materials.

With a stable and sane government in the saddle at Washington, with lowered taxes and a general abolishment of waste and lost motion such as this country has not seen in a generation, a real prosperous year should be ahead of us all.

Our Series on the Pioneers

MODERN Plastic materials owe their origin in most cases to men who have lived and labored in the past generations. Only a few of the more fortunate of the pioneers have survived to see the triumph of their products. By far the greater number of them lived, as do so many of the world's pioneers, ahead of their time.

The children of their brains, and the products of their painstaking endeavors so often lacked some little essential, or failed to interest their contemporaries, so that they led a painful existence for a few years until, usually a little too late, someone else recognized the value of the new product, made obvious improvements, much easier for him in the light of the more advanced knowledge of his day, and put the product over with a will.

The records of these early achievements are buried in the venerable archives of the chemical and technical press; more often as not in a language foreign to the United States, and, at best difficult of access. Only a few of the larger libraries of our country have the early numbers of some of the magazines in which are recorded the achievements of such men as Schuetzenberger, Schoenbein, Boettger, Parkes, Spill, Lebach, Bayer and so many others.

It is doubtful if many of the present generation of users of and artificers in the modern plastic materials are familiar with the work of the pioneers upon whose indefatigable effort the manufacture of their raw materials are based.

In the series of articles "With the Pioneers" beginning with the present issue of the second volume of Plastics an attempt will be made to give honor to these men, to whose vision and energy we owe so much.

As a considerable number of the earlier articles on these plastic materials deal only with the chemical side of the inventors endeavors, and as in most of the cases all references to the personality of the men themselves have been omitted, it will be our pleasure to delve into some of the more intimate history of our pioneers and to thus do justice to their efforts.

Vol. II, No. 1

PLASTICS has now arrived at a stage of its career where there appears to be no doubt that it will be the leading and permanent trade paper of the continually growing and expanding industry of molded products and their congeners.

Although only three numbers have thus far appeared, the periodical having been started in October, 1925, the constant stream of new subscriptions that has poured into our offices and the demands for back issues have exhausted the extra copies so that at present the early numbers are already out of print.

As it is highly desirable that the calender year and volume number of any trade publication that aims at permanency and which will be quoted and used in the future, coincide, so with our January number we will begin pagination again with page 1, and Volume 2. The subsequent issues will then be paginated numerically so that at the conclusion of the second year another volume will have been completed.

PLASTICS

Great Interest Shown in Renaming Pyroxylin

Multiplicity of names leads only to confusion, misunderstanding, and needless duplication

By Carl Marx

REMARKABLE as it may seem, and although almost seventy years have elapsed since the first "pyroxylin plastic" saw the light of day, there has not as yet been adopted a universally applicable name for this class of useful products.

As pointed out in Plastics for December, 1925, there is a real and urgent need for the adoption of some common and easily pronounced and remembered name which can be freely used by anyone, and which is not the sole property of an individual or firm.

In Europe, and especially in Germany, the problem appears to have found a happy solution. The Germans for example have very sensibly named the celluloid-type of pyroxylin products after two syllables, the first one Zell, meaning a cell and also the beginning of the German word Zellulose (cellulose,) and the second one Horn, which means what it says. In other words, in Germany pyroxylin plastics are universally called "Zellhorn." This is not only descriptive, but a clearcut definition of the main outstanding property of the material.

The French, on the other hand, have practically made the word "Celluloide" a part of their language, and any form of pyroxylin plastic material is called by that name.

In England, due to the activities of Daniel Spill in the sixties of the past century, the name Xylonite, which was that given to the pyroxylin plastic of that early inventor, has pretty well maintained itself as a more or less universal term. In America, we have the same name, only spelled with a Z, Zylonite, and which is used quite widely by the optical trade, as for example the manufacturers of eyeglass and spectacle frames. This name was introduced by Spill and Schuepphaus. At one time there was some litigation over it with the Celluloid Company, who claimed that the similarity of sound infringed their trade mark.

Celluloid was the name given to the product by Hyatt, and it must be conceded that inasmuch as he was the first one to make a really successful pyroxylin plastic that the right to name it belongs to him and to his successors. This stand has been approved by judicial decisions, and, legally, no one has the right to use this name for a pyroxylin plastic unless the same is the actual product of the Celluloid Company.

The Arlington Works, years ago adopted a contraction of pyroxylin, namely "Pyralin", and this is a very appropriate and euphonious name. However, it is a trade mark and hence can only be used by their successors, the DuPont concern and the Viscoloid Company.

To give the reader just a faint idea of the number of names which have been proposed, there might be mentioned the list given on page 2669 of Volume 1, of Worden's great encylcopedic work on the "Technology of Cellulose Esters", which is as follows: Argonite, Alberite, Apiroid, Boroid, Camphoid, Celluline, Cellulodine, Cellulosine, Crystaloid, Celluloid, Lithoxyle, Phibrolithoid, Dermatoid, Elastozon, Exonite, Histoloid, Hyaline, Ivorine, Ivoride, Parckut, Prostine, Pyroxylid, Setoloid, Satolite, Securite, Sternoid, Steroxylin, Suberit, Vegetalin, Vitroloid, Xylamile, Xylinite, Xylonith and Xyloidine.

To this might be added some of the modern names as Fiberloid, Piroxloid, Celluvert, Celutex, Nixonoid and countless others.

Is it any wonder that the layman and the purchaser is confused and bewildered when he is assailed by the multitudinous

(*Continued on page 32*)

Morris Marx, President Pyroxylin Fabricators Association says:

"—Believe the difficulty involved in educating the public to the use of a new name for Pyroxylin would not be worth the effort involved in coining and popularizing such a name.

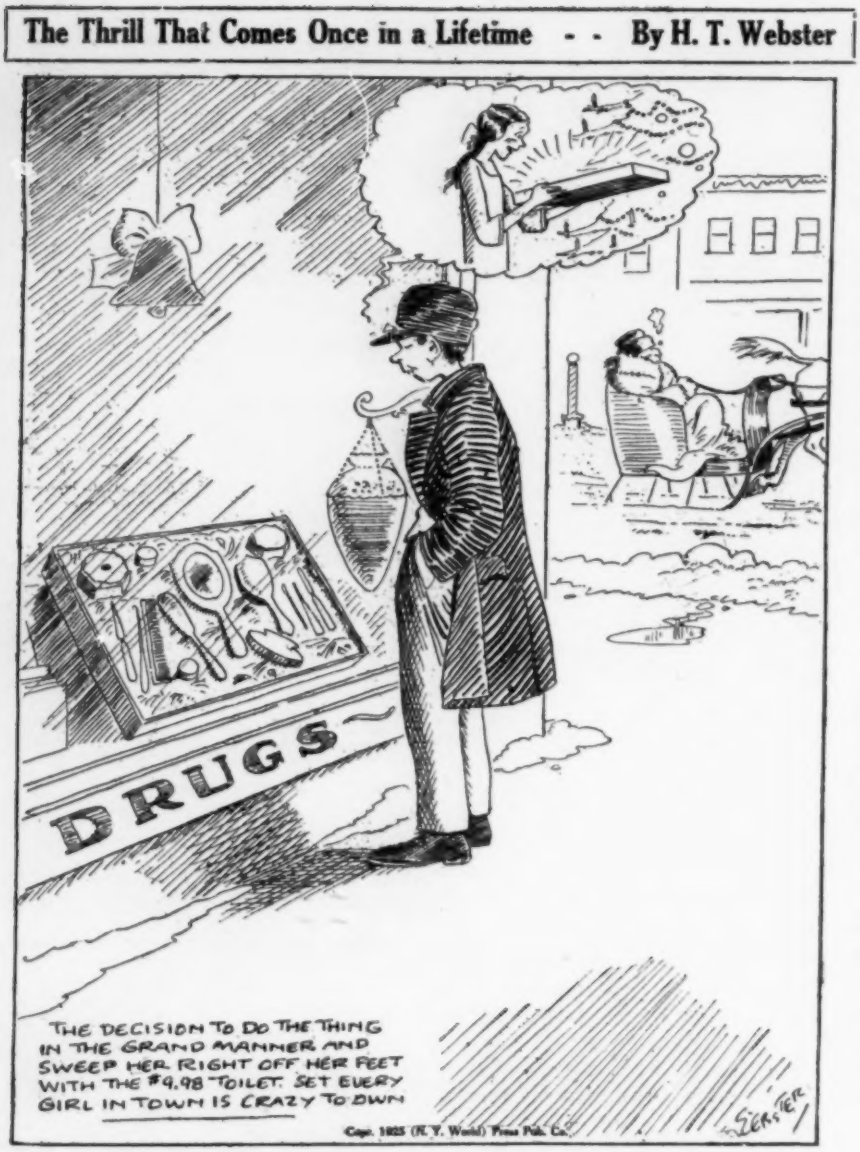
"A new name would require that the symbolic letters of the chemicals composing Pyroxylin be aptly put together."

Edmund B. Levine, Pres. Fiberloid Company opines that

"—it is an excellent idea. At present Pyroxylin is the only important product not generally known by a universally recognized and accepted name. If such a name could be found, a great step forward would be made in bringing the product into public consciousness."

P. N. Gottfried—Purchasing Agent for the Pittsburgh Plate Glass Co. writes

"—submit CELLOX, as apt descriptive, euphonious, as my suggestion for a name which will cover Pyroxylin materials of all kinds. Am convinced that if this name or some similar one was adopted the industry would be greatly benefitted."



A cartoon from the New York Morning World.

Fifth Avenue and Main Street Buy Toilet Sets

By *Saul Meyers*

If so beautiful an object as a well-designed and well-made "pearl" toilet set can really be called a "fad", then there appears to be no doubt that the "fad" is literally sweeping the country.

No matter how small the town, the local drug-store was almost certain to have prominently displayed among its Christmas suggestion a large and very fancy pearl-and-amber pyroxylin toilet set. From personal observation it seems as though this particular combination was the outstanding feature ture of the holiday season which has just drawn to a close, and unless appearances are deceiving, hundreds of thousands of these art objects have found purchasers.

Human nature, especially the feminine variety, is too much given to display and a justifiable pride in possession to literally hide such a light under a bushel.

Now there are a large number of manufacturers in this field, and considerable ingenuity was shown in varying the color-schemes, the outlines and shapes of the mirrors, brushes and smaller objects.

With such a wealth of material to chose from, perhaps next years' output will show still more freedom in design, and a greater diversity. As to the fear expressed in some quarters that the fortunate ladies who had such magnificent sets presented to them by their affectionate admirers would fail to prominently display them on their dressing tables, this is, we believe, unfounded.

Cellulose Expert

Henry Jacobsen, one of the leading experts and consultants in the field of cellulose ester compounds, has established offices at 522 Fifth Avenue, New York City.

Mr. Jacobsen, as consultant for several of the largest German organizations, has created an enviable record in the field of plastics.

At present, Mr. Jacobsen is experimenting with a new type of lacquer that will feature several plastic properties.

New York Firm Expands

The Reich-Asch Corporation 61 Reade Street, has added another building to the Chamber Street side of their establishment. The new addition will be devoted to the manufacture of toilet goods, novelties and cosmetics.

Co-incident with the increased facilities, comes the announcement by Mr. Loeb, an executive of the firm, of the increase of the capitalization from two hundred thousand to five hundred thousand dollars.

Advances in Spectacle Frames
By David R. Ettinger
in February PLASTICS

Non-breakable Watch Crystals

WATCH crystals made of glass are fragile things. You know that if you carry an open-faced watch in your pocket, or wear one on your wrist.

But the situation isn't hopeless, for a Pittsburgh manufacturer has recently developed an improved type of the unbreakable watch crystal, which is made of pyroxylin sheeting, a material of glass-like transparency that is practically unbreakable. A patented feature of this watch crystal is a permanent bevel that holds it in place. Once the crystal is properly fitted, it stays there and is dust-proof. No adhesive is necessary.

The flexibility of pyroxylin plastics makes the fitting of the "Crystaloid" easy. It can be trimmed to size, if necessary, with scissors, cutting pliers, or file, and then the job of inserting it consists merely of placing three sides of the crystal into the groove of the bevel and bending the fourth side until it, too, slips into the groove.

Crystaloids are made at present in thirty fancy shapes and in sizes ranging from one-half to one inch.

New Casein Plastic Makes Good Impression

At the Chemical Exposition recently concluded, the American Machine and Foundry Co. showed a case of very fine ornamental articles made from a new Casein Plastic material which has been called Inda. The material ranged from fountain pens to toilet sets, and clock cases to mechanical pencils. It is understood that the present capacity of the factory producing this material is taxed to its limit, but production is soon to be increased. The company makes only the raw material, leaving it to the fabricators to exercise their ingenuity in using the versatile material.

Billiard Ball Litigation

(*Continued from page 12*)

where they stay for thirty-six hours.

After being in the drying room for eight hours, however, they are coarsely ground. Fourteen hours later the coarsely ground material is reground. At the end of the remaining period of fourteen hours in the drying room the dried material is put into molds and heated, under pressure 3,500 to 4,000 pounds per square inch for 45 minutes at a temperature of about 300°F in a preforming press.

Upon the removal of the balls from the molds they are again subjected to heat and pressure—called "gunning"—of 3,600 to 4,000 pounds pressure per square inch for 35 minutes at a temperature of 340°F in a press known as a Hyatt hydraulic gun as described by Hyatt in his United States patent 239,-791 of 1881.

This about completes the operation as disclosed during the trial of the patent suit. One of the main points of the defense is the fact that a much larger amount of alkali is used in the initial stages than are claimed in Baekeland's patent.

"Heat and Pressure"

While it is admitted that this alkali is neutralized by hydrochloric acid, and the plaintiff, the Bakelite Corporation, maintained that a small amount of alkali remains in the resinous condensation product, the experts for the defendant, Drs. Norris and McCormack testified that the solutions after neutralization showed no signs of alkalinity, and that, in fact, the solutions were actually acid.

The plaintiff attempted to show, by analysis of the finished billiard balls, that small amounts of alkali could be extracted from them by water, the quantities being from 0.08 to 0.16 percent. However, Judge Morris holds that the method shown to have been used by the defendants was old in the art and that both Manasse and Lederer had shown how an initially oily and viscous condensation product could be converted into a final product by such methods.

As to the use of pressure and heat in molding the balls, the court sees in this operation nothing more than the usual methods of molding in hydraulic presses, in which the function of the pressure is to give shape to the object and the heat to render the binder sufficiently plastic to flow and reproduce the intricacies of the mold.

As to the question of whether the final condensation product as made by the Brunswick-Balke-Collender Company was infusible and insoluble before the molding took place, evidence was introduced showing that the condensation product after the acidification and drying, was essentially insoluble in alcohol and infusible in the ordinary sense of the word. Dr. McCormack introduced samples of the product at various stages of the drying, which showed only slight fusion at the edges when heated to 218°C.

To quote the final portion of the decision, Judge Morris holds that "As the material to which the defendant makes a simultaneous application of heat and pressure has the degree of insolubility and infusibility possessed by Bakelite C, and as the plaintiff does not divide its reaction into stages, I think the defendant does not employ the process of the 'heat and pressure' patent."

Further developments of this are awaited with considerable interest by all who mold and fabricate synthetic resin products.

Converting Waste into Wealth

(*Continued from page 16*)

waste is continually in transit to and from the Johnson Product Co. plant, and yet Mr. Johnsons says that the business is still in its infancy.

Although the larger manufacturers of the sheets, rods and tubes consume the greater proportion of the waste, many other line of business find use for it.

The main feature, upon which the success of the business is built, is the extremely carefully sorting and classification given to the highly diversified waste, which is often received in badly mixed condition. By being able to give purchasers a uniform grade of color of waste, the real service rendered the industry lies.

The uses to which the assorted plastic wastes are put are almost too numerous to mention. A great deal of it, especially of the straight colored material, goes back into raw stock. Other uses, especially for clear stock and also for deeply pigmented material, are the manufacture of lacquers and varnishes. For this purpose the pyroxylin plastic waste is comminuted and then taken up with solvents. Such solutions of pyroxylin are useful, and are widely employed for the manufacture of coated fabrics as artificial leather, coated paper, shoe (box-toe) stiffeners and for waterproofing fabrics and paper.

Leather belt cements, waterproof adhesives and the newer kind of automobile paints also consume a large amount of the waste material. Still another method of utilization is the recovery of camphor and the isolation of the cellulose nitrate, although this is still in the experimental stages. The grinding up of the waste to minute fineness, and the molding of the powder thus produced, is one of

the most recent achievements, and when once perfected, bids fair to make use of every ounce of waste material than can be collected.

During 1924, over three and a half million pounds of pyroxylin plastic scrap were handled by Johnson's concern alone; and this represents about seventy percent of the total waste produced.

The present tendency in America is toward conservation not only of raw material but of labor—as witness the truly wonderful results obtained by national economy. Mr. Johnson has also contributed considerably to this end, as every one who saves really produces. It took high courage to undertake this new business as not only had prejudice to be overcome, but fire-hazards had to be faced. But all of these problems have been solved and the present plant is designed for safe and efficient handling of huge quantities of this interesting and valuable material.

Pyroxylin on Glass

From Gummi Ztg. 1925, p. 1826

Pyroxylin material can be attached to glass by softening it with ether or other solvent and pressing the same with gentle pressure against the glass. Especially good results are obtained if the glass is first roughened a little. Still better results can be secured by using a solution of pyroxylin plastic in acetone as an adhesive. The plastic sheet should be soft before attempting to apply it to the glass base.

In Germany Bakelite is finding wide application as a lining for apparatus which is to be subjected to sudden changes in temperature and designed for the storage of acid materials.

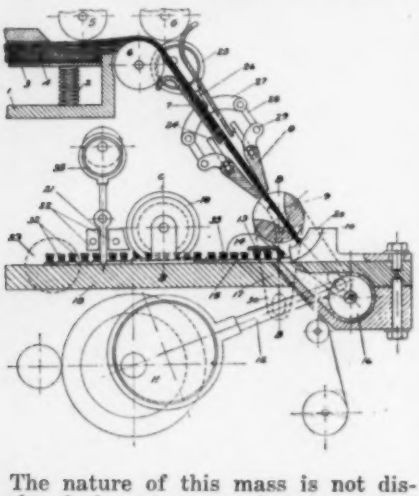
What we don't know about amber.

By Irving Goldberg in PLASTICS for February

TECHNICAL ABSTRACTS
AND PATENT REVIEW

MANUFACTURE OF BRUSHES WITH PLASTIC MATERIAL AS A BINDER. U. S. Pat. 1,563,367, Dec. 1, 1925. J. A. Hultqvist.

The invention relates to a method of manufacturing articles of a brush-like nature by feeding a fibrous material into a suitable plastic binding mass which has the property of hardening or setting relatively quickly.



The nature of this mass is not disclosed, the patent covering the method only. Four claims, of which claim one reads: "The method of manufacturing articles of brush like nature comprising the feeding of a plastic mass into sheet form, the movement forward of said sheet, and the forwardly feeding and insertion of a plurality of distinct bundles of fibres in said plastic material in its plastic state at the point where it is being fed." (see illustration.)

SHELLAC SUBSTITUTE RESISTANT TO ACIDS. U. S. Pat. 1,564,002, Dec. 1st. 1925. Joseph R. Kuhn, assignor by mesne assignments to Carleton Ellis, Montclair, N. J.

A synthetic resin practically completely resistant to strong sulfuric acid, and hence of distinct value in the preparation of acid-proof varnishes and the like is produced by acting upon phenolic bodies with sulfur chloride.

The preferred material is one commercially known as "metaparacresol", which is a mixture of meta-cresol and para-cresol. The amount of sulfur chloride allowed to act on this phenolic body bears an important relation to the properties of the resultant resin. If equal weights of sulfur chloride and the metapara-cresol are used, a soft resin, easily soluble in alcohol results. Resins made with a higher proportion of sulfur chloride are better dissolved in mixtures of alcohol and benzol. In carrying out the invention, the metaparacresol is advantageously first dissolved in benzol or toluol, and the sulfur chloride then slowly added, with thorough agitation. The action is almost instantaneous and is accompanied by the formation of hydrochloric acid and the liberation of heat. The hydrochloric acid formed is removed by blowing steam or heated air through the reaction mixture, and the solvent such as tuluol or benzol is distilled off.

If, however, all the acid is removed, the resin will be dark in color and alcoholic solutions of the same will also have an adverse action on the tin cans in which the product is usually packed. For this reason the resin is preferably kept very slightly acid. It was found that phosphoric acid is much superior, so that after all the hydrochloric acid is driven off some phosphoric acid is added, although oxalic acid will give equivalent results.

The resin is light colored and solutions of about 4 lbs. per gallon of alcohol give the best results. The main use is as a substitute for shellac in varnishing and coating, especially to prevent the action of strong sulfuric acid. The claims cover both process and product, there being sixteen of them.

PLASTIC COMPOSITION AND PROCESS OF MAKING THE SAME. U. S. Pat. 1,563,872, Dec. 1, 1925. Bela W. Rote.

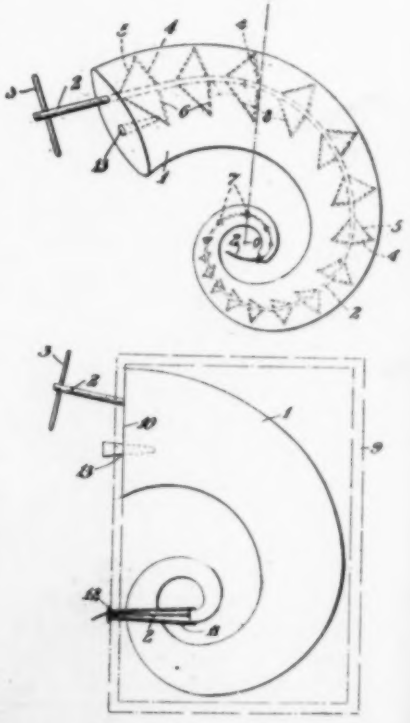
A plastic composition of such properties that it can be used for shoe soles, in place of leather, for gaskets and similar purposes, is producing by mixing, for example 70 parts of cotton or an equivalent material as scrap leather or jute, with 15 parts of pure rubber previously dissolved in gasolene or benzol. After complete removal of the solvent, and admixture of 5 parts of litharge, 5 of magnesia, 3 of lampblack or gloss-black. and 2 of sulfur, the mass is sheeted and finally vulcanized. The claims cover the process of dissolving substantially fifteen parts of rubber in benzol, saturating substantially 65 parts of cotton with the rubber solution, removing the solvent, compressing substantially 20 parts of filler and vulcanizing material into the dried mixture of cotton and rubber, and then vulcanizing.

CELLULOSE DERIVATIVE PLASTICIZER. H. T. Clarke. U. S. Patent 1548932 and 1548933, Aug. 11, 1925.

(1) The use of erythritol tetracetate is claimed as a plasticizing agent for cellulose esters. (2) The same for the cellulose ethers, such as ethyl cellulose.

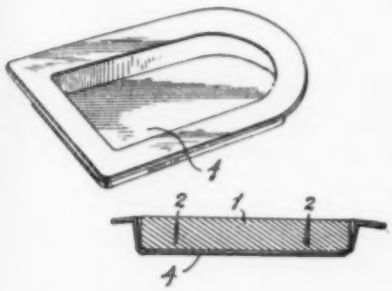
FLEXIBLE CORE FOR MOLDING LOGARITHMIC SPIRALS. U. S. Pat. 1,563,529, December 1st, 1925. Henry S. Satterlee.

The making of molds for such intricate shapes as the logarithmic spirals used in radio loudspeakers has necessitated making such cores up in two sections and cementing them together. The present method obviates this. A pliable and flexible material such as rubber or gelatine, which originally is in a plastic state is formed into the desired shape, and is provided with an inner mechanism consisting of a rope-like structure with fins. (see illustration.) This central core is placed in the casting flask and the plastic material poured around it. When set, the flexible core



is withdrawn by operating the handle attached to the rope, which coacting with the fins will first loosen the core, allow air to get between it and the casting and finally allow of its withdrawal.

CELLULOID MOLD FOR CEMENTITIOUS PLASTICS. U. S. Pat. 1,562,519, Nov. 24, 1925; Frederick C. Ruppel, assignor to Hayes Products Co., Grand Haven, Mich.



In molding or shaping cementitious plastic material such as for example magnesium oxychloride cements, as in the making of toilet-seats, celluloid is softened in boiling water and then given the proper shape between heated dies and allowed to cool. The mold thus produced is then used for making the seat by filling the mold with a magnesium oxychloride mixture and placing the mold and contents on a percussion machine to compact the cementitious material so as to get the greatest possible density in the finished product.

As the material sets there is a certain amount of expansion which would make its removal from a rigid mold practically impossible. The celluloid mold, due to its flexibility yields sufficiently to allow of removal of the hardened mass and at the same time comes away clean.

The inventor explains the term celluloid as being synonymous with pyralin, fiberloid, xylonite, etc. (all spelled without capitals). Three claims all relating to a mold for cementitious plastics formed from celluloid.

PROCESS OF MOLDING PLASTIC BODIES. U. S. Pat. 1,562,520, Nov. 24, 1925. Frederick C. Ruppel, assignor to Hayes Products Co., Grand Haven, Mich.

Relates to method of molding toilet seats from a magnesium oxychloride cement using the celluloid molds of U. S. Pat. 1,562,519 (supra). The essential features is the percussion of the plastic material to remove air bubbles and to form a perfectly smooth top surface.

POROUS PYROXLIN PLASTIC MATERIALS. K. Hansen. English Patent 228844, Feb. 9, 1924.

Porous filters, battery separators or the like may be made by adding to a heavy semi-fluid mass of celluloid some powder such as zinc, magnesium or calcium carbonate or similar acid-soluble material. The material is then shaped as usual, and the powder dissolved out of the mass by treatment with an acid such as hydrochloric acid.

Art in Radio Panels

At the recent radio exposition, Bakelite panels made by the Veri-Chrome Process were the object of considerable attention. Panels, the outward display of the radio set, are made pleasingly attractive by the reproduction of various scenic and other decorative effects. The picture is permanently retained by reason of a surface of protective lacquer.

The sombre sameness of the plain black or brown panel is thus enlivened by designs which may be variously adapted to harmonize with the setting of the room. No more will the listener be confronted by an ordinary surface panel. Before him he will see an extended vista of silhouetted loveliness, replacing the plain drabness of the non-decorative panels that have been in vogue. What a boon for the radio fan with an eye for beauty!

New Buyer For Old Firm

Toilet ware manufacturers may be interested to learn that the firm of Myers Brothers, of Springfield, Iillinois, have a new toilet goods buyer in the person of S. W. Watjen. It may be recalled by some of the older members of this industry that this concern dates back to 1866, having been founded by Albert and Louis. Myers. A new building has recently been opened by the Myers Brothers and they are looking forward to a good holiday trade.

Was Hoover Describing You?

HOOVER SAYS U. S. TRAILS IN SCIENCE

Far Behind Europe in Advancing Fundamental Knowledge, He Tells Engineers Here

Secretary of Commerce Herbert Hoover yesterday lectured to the American Society of Mechanical Engineers here on the value of research in pure science.

It is all very well, he said, this glorifying of America in its progress in industrial science and the accompanying general industrial development, "unparalleled in history," but the backbone of this development, research in pure science, is weak.

"Instead of leading all other countries in the advancement of fundamental scientific knowledge," he declared, "the United States occupies a position far in the rear of the majority of European nations. A list of the awards of the Nobel prizes to men of various nationalities reveals the small proportion of first minds that we support."

—New York World Dec. 2, 1925

IF you, in this industry want to follow Mr. Hoover's advice, if you want knowledge leading to power, you must read **Plastics.**

This publication will keep you informed of all the scientific and practical developments in this fast growing industry.

Fabricators of pyroxylin, molders of insulation, manufacturers of cutlery, toilet ware, optical frames—in fact every user of casein, bakelite, pyroxylin or similar products can profitably read this interesting monthly.

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How, Who, and Why

Answers to Queries from our Readers

Q. What is the material known as *Cellanese?*

Answer. This is not a plastic material, but is the name of a cellulose acetate artificial filament or rayon which is made by the American Cellulose and Chemical Manufacturing Co., of New York City, with factories in Maryland.

Q. We are desirous of obtaining a *Non-Inflammable Transparent Sheet Material* thin enough for *Automobile Back Curtain windows.* Is there any on the market?

Answer. Cellulose acetate sheets, while as transparent as the pyroxylin plastics materials usually employed for side-curtains and back curtain windows, is by no means as combustible, being about equal to heavy paper in this respect. It is non-inflammable in the ordinary sense of the word. Such material is obtainable in New York from the American Cellone Co., under the name of Cellone.

Q. Was Hyatt the first one to make a product like the modern "celluloid?"

Answer. Hyatt is justly credited with the invention of what is now called "celluloid," as he was the first one to realize the latent solvent power of camphor. However, products which quite resembled "celluloid," and which were made from cellulose nitrate or pyroxylin, were known before Hyatt's time. Two English inventors, Alexander Parkes, who discovered Parkesine, and Daniel Spill, who made Xylonite and Zylonite, were on the market with commercial products before Hyatt. Zylonite was made in New England for many years, and this name is still in use, especially among spectacle frame makers. A complete account of these early inventors and their work will begin in January Plastics.

With the Pioneers

(*Continuing the story of C. F. Schoenbein from page 10*)

friend at Baden-Baden on August 29, 1868.

The scientific work which Schoenbein was engaged at the time he made his noteworthy discovery had to do with the preparation and properties of ozone, and also with voltaic electricity and the passivity of metals. In the fall of 1845 he was actively engaged in the preparation of what was at the time considered to be a separate compound of sulfur dioxide and nitrogen tetroxide and which was to be formed by the admixture of sulfuric and nitric acid.

Schoenbein was under the impression that a form of hydrogen dioxide would result from such a mixture or that at least it would have powerful oxidizing properties. He investigated the behavior of certain elements when treated with a mixture of these two acids and found that sulfur, selenium, phosphorus and iodine were rapidly oxidized and converted into acids.

This led him to try the effect of acid mixture upon such organic substances as paper, sugar and cotton. He soon found that paper would be converted to a waterproof and very tough material and which was highly electrical when subjected to friction. The most startling effects however were obtained when cotton was treated. Although externally hardly changed at all, it would burn with great intensity and almost instantaneously.

Schoenbein at once fully recognized the importance of his discovery and kept the method of preparing his new "guncotton" a secret. In the spring of the year he informed the military authorities at Basle and had several experimental shots fired with guncotton.

Shortly thereafter, Professor Boettger, of Frankfurt, claimed to have solved the secret of preparing guncotton, and Schoenbein and the former at once pooled their efforts and agreed to exploit the invention together.

First Guncotton Patent

Prof. Otto, of Braunschweig, however also found out how to nitrate cotton, and published his results. A great controversy a at once arose, as the French also claimed to have invented the material, pointing to the work of Braconnot in 1833 and to that of Pelouze. It was the latter who gave the material the name which has been attached to it ever since, Pyroxylin, although Pelouze freely admitted that the idea of using the substance as an explosive was Schoenbein's.

The first patent on guncotton was taken out in England by Schoenbein under the name of J. Taylor to whom he communicated the invention (English Patent 11407, of 1846). the first American patent, in his own name, being 4874, of 1846.

Popularly Schoenbein has only been credited with the invention of the highly explosive cellulose nitrates, but it is a fact that he contributed also to the discovery of collodion. Soon after Flores Domonte had called attention to the solubility of the guncotton in mixtures of ether and alcohol Schoenbein prepared some of this solution and pointed out its possible value as a substitute for court plaster, which is one of the uses of collodion to this day. In passing it might be noted that it was this collodion or guncotton solution, the spilling of which in later years gave the impetus to the discovery of modern pyroxylin plastics by Hyatt.

It is very interesting to read what Schoenbein thought of his

invention, and to notice how the modern pyroxylin plastics were foreshadowed by some of the objects he made out of his early nitrated paper. Under date of February 27th, 1846, he writes to Faraday:

"I have also made a little chemical discovery which enables me to change very suddenly, very easily and very cheaply common paper in such a way, as to render that substance extremely strong and entirely waterproof." A few weeks later, March 18, 1846, he again writes: "To give you an idea of what to make out of the vegetable fiber, I send you a specimen of a *transparent* substance which I have prepared out of common paper. This matter is capable of being shaped out into all sorts of things and forms and I have made from it a number of beautiful vessels. The first perfect one I obtain is destined to be sent to the Mistress of the Royal Institution, as soon as a convenient opportunity will offer itself for doing so and I shall ask the Lady mentioned to preserve it as a sort of scientific keepsake."

That guncotton would dissolve in ethyl acetate was also known to Schoenbein for he writes in one of his letters to Faraday: "As to guncotton, I send you an account of an analysis made by Mr. Boettger in Frankfurt who used acetic ether as a solvent, etc."

Celluloid Foreshadowed

That Schoenbein's nitrated paper might be useful for window panes was suggested to him by Poggendorf who wrote him in 1848 saying "Your glass-like paper is splendid—I hope you can make it thick enough to use it for window panes."

While Schoenbein did not live long enough to witness the wonderful development of his invention in the peaceful arts, he saw the beginning of its introduction as a military explosive, and according to his own statement was the first person who ever fired a cannon using guncotton as a propellant charge, this hav-

Danger ! Anthrax Germs !

Dread disease is contracted through carelessness in the making of brushes

Bulletin No. 9 deals with anthrax, a much dreaded disease of animals, which formerly was thought not to affect human beings, until several deaths occurred some years ago. As this disease is caused by a germ which is carried on the fur of animals, and on bristles especially, it becomes a source of possible danger in the manufacture of brushes.

How Anthrax May Be Contracted

The disease is contracted by inhaling the dust from infected wool, hides or hair of sheep, goats and horses; from infection from cuts from knives used in dressing diseased hides, etc.

The practice of carrying bundles of rough hides on the shoulder often causes cracks or small chafes of the skin of the neck through which the infection enters, or through scratching with dirty nails.

Symptoms:

The symptoms come on in less than three days. In some cases the disease starts as a pimple or boil, at first painless, but becoming larger, painful, hard and red and afterward discharging pus. The patient has a high fever with chilliness, vomiting, great weakness and delirium. Finally, the condition becomes very grave although the disease is not necessarily fatal. The disease may spread also as a severe inflammation under the skin, which may run into gangrene. This is called "malignant edema."

Anthrax may also affect the lungs, causing pains in the chest and suffocation, and another form of the disease known as the intestinal form has as its symptoms high fever, chills, vomiting, constipation and hemorrhage from the bowels.

Preventive Measures:

Workers who are exposed to anthrax should protect themselves by wearing either respirators or else should protect the mouth and nose by gauze, and the shoulders and necks of men who carry hides should be well protected by pads and gloves should be worn and what is especially important, whenever a person exposed finds the smallest crack or scratch on his hands or neck a physician should be seen at once. As a general preventive, hides should be disinfected before shipment.

If any worker or any employer in the State of New York will write to the New York State Department of Labor, Industrial Hygiene Division, 124 East 28th Street, New York City for advice or information concerning these bulletins a prompt reply will be forthcoming.

ing taken place on July 28, 1846.

However, when the possibility of nitrating cellulose had once been demonstrated, opportunity was given to others to perfect the process and the long list of patient and brilliant investigators contains the name of some of the world's greatest minds. Schoenbein, as far as the pyroxylin industry is concerned, stands about in the position of Columbus—he discovered the new land which proved such a fertile field for those who came after him.

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Pyroxylin Name

(*Continued from page 21*)

claims of the various manufacturers? How is he to know that, fundamentally, all these names refer to practically one and the same material; namely a form of cellulose nitrate together with a plasticizing agent. And that, after all, is just what a "pyroxylin plastic" is, nothing more.

Several of our friends have expressed their opinion that "pyroxylin is all right—it has the sanction of long-continued use—and is generally (?) understood by 'the trade' ". But is it?

We have made many inquiries among people who were fully conversant with Celluloid and Pyralin articles, and who handled and sold them. When we asked them if they had any "Pyroxylin" goods they had to have the matter explained to them. Three out of every nine stenographers fail to spell pyroxylin correctly at the first trial. Many dictionaries are silent on the subject.

However, the word Celluloid, due to its almost universal use, has become almost a part of the language. This is unfortunate from the viewpoint of the holders of the original rights under Hyatt patents. The patents have expired generations ago, but the trade-mark apparently is destined to immortality.

A very interesting sidelight is

thrown on all this by the fact that even in United States patents, inventors and patent attorneys are forced to "explain" what they mean when they say "celluloid." For example witness a patent issued only on November 24th of the past year, No. 1,562,519 to F. C. Ruppel. In this case the inventor, or his attorney, says "By 'Celluloid' I mean any of the nitro-cellulose plastics which appear in commerce under the trade-names of 'celluloid', pyralin', fiberloid', 'Xylonite', etc." Then he goes on and calls it celluloid, without quotes, throughout the rest of the patent.

Opinions

For the sake of clarity, sanity and euphony, let us adopt a name that really means something and that is not hedged in on every side by legal barbed-wire fences. Pyroxylin means simply a form of cellulose nitrate That was the original meaning and should be retained for just what it stands for. The admixture of a plasticier so alters the properties of the particular cellulose nitrate called pyroxylin as to make it truly a different substance. If we really made toilet sets and combs from true "pyroxylin" woe would betide any damsel so reckless as to risk their use.

Names and all kinds of suggestions have been pouring in on us since we first broached the subject last month. But we want the opinion of the entire industry. We want to hear from every interested party—manufacturer, jobber, retailer and user. It is an important question and adoption of a universal name will do much to further the continued popularity of one of the finest plastic materials presented to mankind by the genius of the chemist and engineer.

A New Ethyl Cellulose Plastic In February

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